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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/560,131	05/12/2006	Hiroyuki Ochiai	283232US2XPCT	1358
22850 7590 05/25/2011 OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, L.L.P. 1940 DUKE STREET ALEXANDRIA, VA 22314				
EXAMINER WAITS, ALAN B				
ART UNIT 3656		PAPER NUMBER		
NOTIFICATION DATE 05/25/2011		DELIVERY MODE ELECTRONIC		

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Notice of the Office communication was sent electronically on above-indicated "Notification Date" to the following e-mail address(es):

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Office Action Summary

Application No.

10/560,131

Applicant(s)

OCHIAI ET AL.

Examiner

ALAN WAITS

Art Unit

3656

Period for Reply -- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 07 March 2011.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 21, 23-26, 28-33, 45, 48 and 49 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 21, 23-26, 28-33, 45, 48 and 49 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 31 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some * c) ☐ None of:
- 1) ☒ Certified copies of the priority documents have been received.
 - 2) ☐ Certified copies of the priority documents have been received in Application No. _____.
 - 3) ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
Paper No(s)/Mail Date _____
- 4) ☐ Interview Summary (PTO-413)
Paper No(s)/Mail Date: _____
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: _____

Claim Rejections - 35 USC § 103

1. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

2. Claims 21, 23, 24 and 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Dittberner U.S. 4,792,277 and Fujii U.S. 5,660,480.

Re claim 21, Bruce discloses a rotation member (Fig. 3) applied to and rotating in a housing (310), the rotation member comprising an engaging portion (350), the engaging portion formed on a longitudinal end of the rotation member on a cylindrical side surface around a circumference of the rotation member, the engaging portion being held by the housing and rotating relative to the housing, a coating (360 and 370) covering the engaging portion and including a mixture a wear-resistant material WC ([0039], fifth sentence) and a solid lubricant ([0040]).

Bruce does not explicitly disclose that the engaging portions are formed on longitudinal ends of the rotation member.

Dittberner discloses a rotating member (16, Fig. 1) comprising engaging portions (32, and 18) formed on longitudinal ends of the rotation member.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide that engaging portions are

formed on both longitudinal ends of the rotation member for the purpose of providing better structural integrity to the device by supporting the rotation member on both sides.

Bruce does not disclose that the solid lubricant is selected from the group consisting of hexagonal BN, Cr_2O_3 , WS_2 and BaZrO_4 .

Fujii teaches a solid lubricants for a coating comprising hexagonal BN (col. 7, lines 28-35) for the purpose of providing increased durability of the device.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide that the solid lubricant is hexagonal BN for the purpose of providing increased durability of the device.

The limitation "the coating being deposited from a tool electrode including a wear-resistant materials and the solid lubricant by processing the engaging portions as a workpiece with electric spark machining" is considered a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In *re Thorpe*, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 23, Bruce in view of Fujii further discloses that the coating consists essentially of a wear-resistant material WC ([0039]; Bruce) and a solid lubricant hexagonal BN (col. 7, lines 28-35).

Re clm 24, the limitation "the electric spark machining is carried out with rotating the rotation member" is a product-by-process limitation. The patentability of a product

does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 32, Bruce further discloses a shaft structure of variable vanes for regulating a fluid (Fig. 1 and 3).

3. Claims 26, 28, 33 and 45 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Yamamoto U.S. 6,874,942 and Fujii U.S. U.S. 5,660,480.

Re clm 26, Bruce discloses a housing (310) for rotatably supporting a rotation member, the housing comprising the rotation member (350), a supporting portion (where 310 meets 330) configured to rotatably support each longitudinal end of the rotation member such that the rotation member rotates relative to the housing, a coating (370) including a mixture of a wear-resistant material WC ([0039], fifth sentence).

Bruce does not disclose the coating includes a mixture of one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr₃C₂, ZrO₂-Y, and TiB, and one or more solid lubricants from the group consisting of hexagonal BN, Cr₂O₃, WS₂ and BaZrO₄.

Yamamoto teaches a hard coating layer comprising a coating including cubic BN, WC, TiC and Cr₂O₃ for the purpose of improving wear resistance (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide the coating includes a mixture of

one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr₃C₂, ZrO₂-Y, and TiB, and one or more solid lubricants from the group consisting of hexagonal BN, Cr₂O₃, WS₂ and BaZrO₄ for the purpose of improving wear resistance.

Bruce does not disclose that the coating covers a bearing surface of the supporting portion into which the rotation member is inserted.

Fujii teaches alternatively coating the bearing housing with a layer (col. 7, lines 28-35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the location of the coating of Bruce with the location taught by Fujii to provide that the coating covers a bearing surface of the supporting portion into which the rotation member is inserted to achieve the predictable result of improving the wear resistance of the bearing interface.

The limitation "the coating being deposited from a tool electrode including a wear-resistant materials and the solid lubricant by processing the engaging portions as a workpiece with electric spark machining" is considered a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 28, Bruce in view of Yamamoto further disclose that the coating consists essentially of a wear-resistant material WC ([0039], fifth sentence) and a solid lubricant Cr_2O_3 .

Re clm 33, Bruce further discloses a shaft structure of variable vanes for regulating a fluid (Fig. 1 and 3).

Re clm 45, Bruce further discloses a bush (330, Fig. 3) disposed in the supporting portion and surrounding each of the engaging portions, the bush being formed of a different material than a remainder of the housing.

4. Claim 49 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Yamamoto U.S. 6,874,942 and Fujii U.S. 5,660,480 as applied to claim 26 above, and further in view of Tsuji U.S. 6,234,678.

Bruce in view of Yamamoto and Fujii disclose all the claimed subject matter as described above.

Re clm 49, Bruce in view of Yamamoto does not disclose that the coating includes one or more solid lubricants selected from the group consisting of hexagonal BN, WS_2 , and BaZrO_4 .

Tsuji discloses particles of WS_2 and nitrides (col. 2, lines 6-11) being equivalent to the TiC , TiN , B_4C and TaC of Yamamoto (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce in view of Yamamoto and include WS_2 or hexagonal BN (nitrides) in the coating for the purpose of improving the wear resistance of the hard coating.

5. Claims 21 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Dittberner U.S. 4,792,277 and Yamamoto U.S. 6,874,942.

Re clm 21, Bruce discloses a rotation member (Fig. 3) applied to and rotating in a housing (310), the rotation member comprising an engaging portion (350), the engaging portion formed on a longitudinal end of the rotation member on a cylindrical side surface around a circumference of the rotation member, the engaging portion being held by the housing and rotating relative to the housing, a coating (360) covering the engaging portion.

Bruce does not explicitly disclose that the engaging portions are formed on longitudinal ends of the rotation member.

Dittberner discloses a rotating member (16, Fig. 1) comprising engaging portions (32, and 18) formed on longitudinal ends of the rotation member.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide that engaging portions are formed on both longitudinal ends of the rotation member for the purpose of providing better structural integrity to the device by supporting the rotation member on both sides.

Bruce does not disclose the coating includes a mixture of one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr₃C₂, ZrO₂-Y, and TiB, and one or more solid lubricants from the group consisting of hexagonal BN, Cr₂O₃, WS₂ and BaZrO₄.

Yamamoto teaches a hard coating layer comprising a coating including cubic BN, WC, TiC and Cr_2O_3 for the purpose of improving wear resistance (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide the coating includes a mixture of one or more wear-resistant materials selected from the group consisting of Si, cubic BN, TiC, WC, SiC, Cr_3C_2 , $\text{ZrO}_2\text{-Y}$, and TiB, and one or more solid lubricants from the group consisting of hexagonal BN, Cr_2O_3 , WS_2 and BaZrO_4 for the purpose of improving wear resistance.

Re clm 23, Bruce in view of Yamamoto further discloses that the coating consists essentially of one of cubic BN, TiC, WC and Cr_2O_3 .

6. Claim 48 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Dittberner U.S. 4,792,277 and Yamamoto U.S. 6,874,942 as applied to claim 21 above, and further in view of Tsuji U.S. 6,234,678.

Bruce in view of Yamamoto and Dittberner disclose all the claimed subject matter as described above.

Re clm 48, Bruce in view of Yamamoto does not disclose that the coating includes one or more solid lubricants selected from the group consisting of hexagonal BN, WS_2 , and BaZrO_4 .

Tsuji discloses particles of WS_2 and nitrides (col. 2, lines 6-11) being equivalent to the TiC, TiN, B_4C and TaC of Yamamoto (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce in view of Yamamoto and include WS_2 or

hexagonal BN (nitrides) in the coating for the purpose of improving the wear resistance of the hard coating.

7. Claim 25 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Dittberner U.S. 4,792,277 and Yamamoto U.S. 6,874,942 as applied to claim 21 above, and further in view of Ghosh U.S. 5,190,450.

Bruce in view of Dittberner and Yamamoto discloses all the claimed subject matter as described above.

Re clm 25, Bruce does not disclose grooves configured to pool lubrication liquid being formed concentrically around the engaging portions.

Ghosh teaches grooves (30, Fig. 5) for the purpose of lubricating shafts connected to a housing.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide grooves configured to pool lubrication liquid being formed concentrically around the engaging portions for the purpose of lubricating shafts connected to a housing.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bruce U.S. 2004/0240991 in view of Yamamoto U.S. 6,874,942 and Fujii U.S. U.S. 5,660,480 as applied to claim 26 above, and further in view of Ghosh U.S. 5,190,450.

Bruce in view of Fujii and Yamamoto discloses all the claimed subject matter as described above.

Re clm 29, Bruce does not disclose grooves configured to pool lubrication liquid being formed concentrically around the engaging portions.

Ghosh teaches grooves (30, Fig. 5) for the purpose of lubricating shafts connected to a housing.

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Bruce and provide grooves configured to pool lubrication liquid being formed concentrically around the engaging portions for the purpose of lubricating shafts connected to a housing.

9. Claims 21, 24, 25 and 30 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh U.S. 5,190,450 in view of Yamamoto U.S. 6,874,942.

Re clm 21, Ghosh discloses a rotation member (13 and 24, Fig. 3) applied to and rotating in a housing, the rotation member comprising engaging portions (24, on each side) respectively formed on longitudinal ends of the rotation member on a cylindrical side surface around a circumference of the rotation member, the engaging portions being held by the housing and rotating relative to the housing and a coating (col. 4, lines 7-13) covering the engaging portions and including the wear-resistant material WC.

Ghosh does not disclose that the coating also includes one or more solid lubricants consisting of hexagonal BN, Cr_2O_3 , WS_2 and BaZrO_4 .

Yamamoto teaches a hard coating layer comprising a combination of WC, TiC, Cr_2O_3 and cubic BN for the purpose of improving the wear resistance of the hard coating layer (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Ghosh and provide that the coating also includes a solid lubricants Cr_2O_3 for the purpose of improving the wear resistance of the hard coating layer.

The limitation "the coating being deposited from a tool electrode including a wear-resistant materials and the solid lubricant by processing the engaging portions as a workpiece with electric spark machining" is considered a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 24, the limitation "the electric spark machining is carried out with rotating the rotation member" is a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 25, Ghosh further discloses grooves (30, Fig. 5) configured to pool a lubrication liquid are formed concentrically around the engaging portions.

Re clm 30, Ghosh further discloses a gear box (Fig. 3) comprising the rotation.

10. Claims 26, 29 and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ghosh U.S. 5,190,450 in view of Fujii U.S. 5,660,480 and Yamamoto U.S. 6,874,942.

Re clm 26, Ghosh discloses a housing (12, 16 and 18, Fig. 3) for rotatably supporting a rotation member, the housing comprising the rotation member (13), a supporting portion configured to rotatably support each longitudinal end (24) of the rotation member such that the rotation member rotates relative to the housing and a coating (col. 4, lines 7-10) including a wear-resistant material WC.

Ghosh does not disclose that the coating covers a bearing of the supporting portion into which the rotation member is inserted.

Fujii teaches alternatively coating the bearing housing with a layer (col. 7, lines 28-35).

It would have been obvious to one of ordinary skill in the art at the time of the invention to substitute the location of the coating of Ghosh with the location taught by Fujii to provide that the coating covers a bearing of the supporting portion into which the rotation member is inserted to achieve the predictable result of improving the wear resistance of the bearing interface.

Ghosh does not disclose Ghosh does not disclose that the coating also includes one or more solid lubricants consisting of hexagonal BN, Cr_2O_3 , WS_2 and BaZrO_4 .

Yamamoto teaches a hard coating layer comprising a combination of WC, TiC, Cr_2O_3 and cubic BN for the purpose of improving the wear resistance of the hard coating layer (col. 18, lines 28-36).

It would have been obvious to one of ordinary skill in the art at the time of the invention to modify the teachings of Ghosh and provide that the coating also includes a solid lubricants Cr_2O_3 for the purpose of improving the wear resistance of the hard coating layer.

The limitation "the coating being deposited from a tool electrode including a wear-resistant materials and the solid lubricant by processing the engaging portions as a workpiece with electric spark machining" is considered a product-by-process limitation. The patentability of a product does not depend on its method of production. If the product in the product-by-process claim is the same as or obvious from a product of the prior art, the claim is unpatentable even though the prior product was made by a different process." In re Thorpe, 777 F.2d 695, 698, 227 USPQ 964, 966 (Fed. Cir. 1985). See MPEP 2113.

Re clm 29, Ghosh further discloses that the bearing includes a groove (30, Fig. 5) configured to pool a lubrication liquid.

Re clm 31, Ghosh further discloses a gear box (Fig. 3) comprising the housing.

Response to Arguments

11. Applicant's arguments with respect to claims 21, 23-26, 28-33, 45, 48 and 49 have been considered but are moot in view of the new ground(s) of rejection.

Although two of the rejections above use the same obviousness rejection as the previous office action, the interpretation and application of the art has changed.

Applicant argues that Yamamoto does not disclose or suggest that the coating must include WC and Cr_2O_3 . The examiner agrees that the layer disclosed by

Yamamoto does not have to include WC and Cr_2O_3 , however, Yamamoto use the phrase "at least one material of" meaning the prior art reference includes combinations of the materials listed as well as individual materials. Applicant has labeled the materials as solid lubricants. It is irrelevant that Yamamoto does not call the same material, here Cr_2O_3 , a solid lubricant, since Yamamoto discloses the combination as required by the claim and therefore meets the limitations.

Conclusion

12. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Inspektor U.S. 6,096,436 discloses cubic BN and hexagonal BN in a layer (col. 7, paragraph 2). Bruce U.S. 7,163,369 discloses a hard layer on bother the housing and the shaft (370, Fig. 6). Tanaka U.S. 5,185,216 discloses SiC, TiC, WS_2 as equivalents in layers (col. 2, lines 24-30). Todman U.S. 4,861,228 discloses a variable vane in Fig. 2.

13. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALAN WAITS whose telephone number is (571)270-3664. The examiner can normally be reached on Monday through Friday 7:30 am to 5 pm EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richard Ridley can be reached on 571-272-6917. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Alan B Waits/
Examiner, Art Unit 3656

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/Thomas R. Hannon/

Primary Examiner, Art Unit 3656